

## REMARKS

Claims 13-24 have been canceled without prejudice or disclaimer. Claims 25-45 have been added and therefore are pending in the present application. Claims 25-45 are supported throughout the specification.

The specification has been amended to correct the international application number in the Cross-Reference to Related Applications section.

It is respectfully submitted that the present amendment presents no new issues or new matter and places this case in condition for allowance. Reconsideration of the application in view of the above amendments and the following remarks is requested.

### **I. The Rejection of Claims 14-17, 21, 23 and 24 under 35 U.S.C. 112**

Claims 14-17, 21, 23 and 24 are rejected under 35 U.S.C. 112 as being indefinite. Specifically, the Examiner objected to the terms "pre-saccharification", "for example", and "preferably" and the recitation of multiple ranges. Claims 13-24 have been rewritten as claims 25-45 to address this rejection. Applicants therefore submit that this rejection has been overcome.

### **II. The Rejection of Claims 13-16 and 18-24 under 35 U.S.C. 103**

Claims 13-16 and 18-24 are rejected under 35 U.S.C. 103 as being unpatentable over Laroye et al. (WO 97/42301) in view of Antrim (U.S. Patent No. 5,180,669) and Wang (Cellulose Degradation) with support from Thompson et al. (U.S. Patent No. 6,468,355). This rejection is respectfully traversed.

Laroye et al. disclose a process of preparing wort comprising liquefaction and saccharification of cereal material in the presence of a mixture of enzyme activities comprising beta-glucanase and xylanase activities.

Antrim discloses liquefaction of granular starch using an alpha-amylase comprising adding an excess amount of calcium ion.

Thompson et al. disclose a process of manufacturing boiling-stable granular resistant starch by subjecting a starch source to acid hydrolysis followed by a hydrothermal treatment.

As the Office concedes, none of these references (Laroye et al., Antrim and Thompson et al.) teaches or suggests a process of producing ethanol, comprising preliquefying a mash comprising a starch containing material and water in the presence of a beta-glucanase to form preliquefied mash, as claimed herein.

However, the Office Action states that preliquefaction is taught by Wang as follows:

Wang teach that adding beta-glucanase degrades the cellulose to make it more amorphous and thus more accessible to enzymatic digestion (page 2 paragraph 1-3). Wang also teach an acid hydrolysis procedure that is similar to Antrim that uses headed [sic] acid to hydrolyze the cellulose and make it amorphous. Therefore it would be obvious to one of ordinary skill in the art to substitute an enzymatic hydrolysis step for an acid hydrolysis step for preliquefaction [sic] of the substrate before jet cooking. Both methods achieve the same result by breaking down the cellulose so that the starch is more accessible to enzymatic degradation to glucose and as such are obvious equivalents (M.P.E.P. 2144.06) according to Wang.

This is respectfully traversed.

Wang et al. relates to cellulose degradation and therefore is irrelevant to Applicants' claimed invention. The present invention relates to the conversion of starch to dextrin, which is then converted to ethanol. Applicants' process does not relate to the conversion of cellulose to ethanol. Moreover, all of the other cited references (Laroye et al., Antrim and Thompson et al.) relate to processes using starch (not cellulose) as a substrate. Since the references use different substrates, the processes described in the other references are not related to the process described in Wang. Therefore, it is improper to combine Wang with the other references.

As explained in Applicants' specification, the preliquefaction step using a beta-glucanase reduces the viscosity of the mash, which results in increased flow rates of the liquefied mash, thereby increasing the capacity of the production plants.

For the foregoing reasons, Applicants submit that the claims overcome this rejection under 35 U.S.C. 103. Applicants respectfully request reconsideration and withdrawal of the rejection.

### **III. The Rejection of Claims 17 and 21 under 35 U.S.C. 103**

Claims 17 and 21 are rejected under 35 U.S.C. 103 as being unpatentable over LaRoye et al., Antrim, and Wang with support from Thompson et al., and further in view of Kleman-Leyer et al. (Applied and Environmental Microbiology, 1996, 62(8): 2883-2887). This rejection is respectfully traversed.

As set forth in Section II above, Laroye et al., Antrim and Thompson et al. do not teach or suggest a process of producing ethanol, comprising preliquefying a mash comprising a starch containing material and water in the presence of a beta-glucanase to form preliquefied mash and the Wang et al. reference is irrelevant to Applicants' claimed invention.

Kleman-Leyer et al. disclose an endoglucanase derived from *Trichoderma reesei*. However, Kleman-Leyer et al. also do not teach or suggest a process of producing ethanol, comprising preliquefying a mash comprising a starch containing material and water in the presence of a beta-glucanase to form preliquefied mash.

For the foregoing reasons, Applicants submit that the claims overcome this rejection under 35 U.S.C. 103. Applicants respectfully request reconsideration and withdrawal of the rejection.

#### **IV. Conclusion**

In view of the above, it is respectfully submitted that all claims are in condition for allowance. Early action to that end is respectfully requested. The Examiner is hereby invited to contact the undersigned by telephone if there are any questions concerning this amendment or application.

Respectfully submitted,

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